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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/638,174	08/07/2003	Dale W. Schroeder	10004207-1	3783

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AGILENT TECHNOLOGIES, INC.
Legal Department, DL429
Intellectual Property Administration
P.O. Box 7599
Loveland, CO 80537-0599

EXAMINER	
STEIN, JAMES D	

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 10/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/638,174	SCHROEDER, DALE W.	
	Examiner	Art Unit	
	James D. Stein	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *9/8/05 (RCE)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,7-12,16-19,21 and 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,7-12,16-19,21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/8/05 has been fully considered and entered. Claims 1, 7 and 16 are amended, claims 2, 5-6, 13-15 and 20 have been cancelled, and new claims 21-22 have been added. Therefore, claims 1, 3-4, 7-12, 16-19 and 21-22 are pending in the application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-4, 7-12, 16-19 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over [USPUB 20020181843] to Vaganov and further in view of [USPAT 6,320,993] to Laor, both of which disclose related optical switch devices.

With regard to claims 1, 7, and 16, Vaganov discloses a MEMS optical switch. Fig. 4 shows input optical fibers 12 for receiving beams of light and output optical fibers 26. Fig. 5 shows a first array of support devices 32 connected to said input optical fibers 12 for creating bends in said fibers. Also, a second array of support devices 36 is shown connected to said output optical fibers 26 for creating a bend in said output optical fibers 26. Furthermore,

Vaganov teaches bends in said input and output optical fibers to direct the beams of light from the input optical fibers 12 to said output optical fibers 26: "At least a portion of the distal ends of the optical fibers move in three orthogonal and at least two angular dimensions to direct output beams from the plurality of transmitting devices to the plurality of receiving devices [0040]." It is noted to applicant that "transmitting devices" comprises input optical fibers while "receiving devices" comprises output optical fibers. Fig. 5 clearly shows bends in the input 12 and output 26 optical fibers and said beams of light being directed from input optical fibers 12 to output optical fibers 26.

Therefore, Vaganov discloses the claimed invention except for a mirror positioned opposite the input optical fiber and the output optical fiber for receiving the beam of light from the input optical fiber and for reflecting the beam of light to the output optical fiber. Fig. 1B of Laor shows a similar optical switch 10' wherein a mirror 17 positioned opposite input optical fibers 12' and output optical fibers 14' directs a beam of light 15 from the input fibers 12' to the output fibers 14'. Laor teaches that this configuration is advantageous because it reduces the depth (or size) of the switch 10' by enabling both input 12' and output 14' fibers on the same side of the device. Furthermore, Laor also suggests that the input and output fibers are bent by forces so as to direct the beam of light from the input 12' to the output 14' fibers (col. 12 lines 47-50 and col. 20 lines 40-44). Therefore, one of ordinary skill in the art would have been motivated to, and found it obvious to, modify the switch disclosed by Vaganov such that a mirror is positioned opposite the input and output optical fibers so as to direct beams of light from the input fibers to the output fibers in order to reduce the depth of the switch, thereby confining it to

a smaller space. Furthermore, the method of directing a beam of light regarding claim 16 is inherent to this disclosure.

With regard to claims 3, 8 and 17, in addition to the rejection of claim 1 previously discussed above, Figs. 21 A and B of Vaganov show an actuator device which is associated with each of the plurality of optical fibers 12, each mounted on array of support devices 32 used to create various directional bends in optical fibers 60. Among other detail, the teaching in paragraph [0140] indicates that a voltage applied on electrodes 174 and 176 will generate a force and cause a first actuator 190 to bend fiber toward the +Y direction. It is also taught that a voltage applied on electrodes 180 and 182 will generate a force and cause a second actuator 194 to bend the fiber in the -Y direction. Therefore, one can infer that a voltage applied on electrodes 177 and 178 will generate a force and cause actuator 192 to bend the fiber in the +X direction. This teaching anticipates applicants claim because first actuator 190 in a first pair of actuators 190 and 192 causes a force along an axis (+Y) to bend the input fiber 60, which is perpendicular to axis (+X) along which a force is generated by said second actuator 192 in first pair of actuators 190 and 192 to create a bend in the input optical fiber. Furthermore, the method of directing a beam of light regarding claim 17 is inherent to this disclosure.

With regard to claims 4, 9 and 18, in addition to the rejection of claim 3 discussed above, Fig. 3 of Vaganov shows identical structure for both first 32 and second 34 array of support devices (same construction for input and output devices). Furthermore, Vaganov teaches, "FIG. 3 illustrates one embodiment of an optical switch 30 of the present invention. The FIG. 3 embodiment includes five major components, a transmitting unit, hereafter a "transmitting array" 32, an optical transparent media 34, a receiving unit, hereafter a "receiving array" 36, a control

system 38 and a packaging 40. Transmitting and receiving arrays 32 and 36 each include an optical body 42, a fiber connector 44, a cavity 46, a lens 48, a focusing device 50 and a transmitting directing device 54 [0080]." Therefore it is inherent that Figs. 21 A and B also show an actuator device which is associated which is associated with each of the plurality of optical fibers 26, each mounted on said second array of support devices 36 used to create various directional bends in optical fibers 60. Among other detail, the teaching in paragraph [0140] indicates that a voltage applied on electrodes 186 and 184 will generate a force and cause a third actuator 196 to bend fiber toward the -X direction, and that a voltage applied on electrodes 182 and 180 will generate a force and cause a fourth actuator 194 to bend the fiber in the -Y direction. This teaching anticipates applicants claim because said third actuator 196 in a said second pair of actuators 196 and 194 causes a force along an axis (-X) to bend the output optical fiber, which is perpendicular to an axis (-Y) along which a force is generated by said second actuator 194 in first pair of actuators 196 and 194 to bend the output optical fiber. Furthermore, the method of directing a beam of light regarding claim 18 is inherent to this disclosure.

With regard to claim 10, in addition to the rejection of claim 9 previously discussed above, Fig. 21A shows a first plurality of bands (174-186) of material surrounding the input optical fibers 12 (Fig. 3). This structure is associated with each of the input optical fibers 12 within said first array of support devices 32. This feature is illustrated clearly by the side cross-sectional view of Fig. 21B.

As discussed above, since the construction is identical for both input 32 and output 36 arrays, Fig. 21A also implies a *second* plurality of bands (174-186) of material surrounding the input optical fibers 26 (Fig. 3). This structure is associated with each of the input optical fibers

26 within said second array of support devices 36. This feature is illustrated clearly by the side cross-sectional view of Fig. 21B.

With regard to claim 11, in addition to the rejection of claim 10 discussed above, as discussed above, a voltage applied between bands 174 and 176, and bands 177 and 178 create a force between said bands and said first pair of actuators 190 and 192 so as to cause impart a bend in said input fibers 12. Vaganov teaches the force between electrode bands and actuators to cause fiber bending: "When a voltage is applied to plates 174 or 178 the electrostatic force attracts corresponding parts of moveable member 172. This results in a change of the angle or position of fiber 60 and beam 196 to create the required tilt or angle of the outgoing light beam [0137]." This disclosure anticipates the applicant's claim.

With regard to claim 12, since the construction is identical for both input 32 and output 36 arrays, the discussion above regarding claim 11 implies that a voltage applied between bands 180 and 182, and bands 184 and 186 create a force between said bands and said second pair of actuators 194 and 196 so as to cause impart a bend in said output fibers 12. Vaganov teaches the force between electrode bands and actuators to cause fiber bending: "When a voltage is applied to plates 174 or 178 the electrostatic force attracts corresponding parts of moveable member 172. This results in a change of the angle or position of fiber 60 and beam 196 to create the required tilt or angle of the outgoing light beam [0137]." This disclosure anticipates applicants claim.

With regard to claim 19, the method of directing a beam of light is inherent to the disclosed apparatus described above in the rejections of claims 10-12. For clarity, it is noted to applicant that the "first pair of actuators" and "second pair of actuators" of claims 11 and 12,

comprise the "first and second actuators" and "third and fourth actuators" of claim 19, respectively.

With regard to claims 21 and 22, in addition to the rejections of claims 1 and 7 previously discussed above, the examiner believes that Fig. 1B of Laor shows input 12' and output 14' optical fibers to comprise separate bundles (bundled together by rectangular portions). Moreover, since optical fiber bundles are well-known in the art to be preferred when a plurality of optical fibers are concentrated in a single area (i.e. an input and/or output region), which is the case in both the Vaganov and Laor references, one of ordinary skill in the art would have found it an obvious matter of design choice to ensure that the input and output optical fibers are included in a single fiber bundle, as claimed by applicant, in order to organize the input and output fibers of the device and effectively confine them to the input and output regions, respectively.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James D. Stein whose telephone number is (571) 272-2132. The examiner can normally be reached on M-F (8:00am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James D. Stein
Patent Examiner, AU 2874

John D. Lee
Primary Examiner